

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A vehicular rotating electrical machine apparatus comprising:

a rotating electrical machine including a shaft rotatably supported by a pair of brackets having a suction hole at an end face and an exhaust hole at an outer periphery, a rotor disposed in the pair of brackets, fixed to the shaft, having a field winding mounted to an inside, and having cooling fans mounted to both end faces, and an armature fixed to the pair of brackets at an outer periphery of the rotor to surround the rotor and including an armature iron core on which an armature winding is wound, and

an inverter unit which converts DC power of a battery into AC power, supplies the AC power to the armature winding and causes the rotor to generate rotating power, or converts AC power generated in the armature winding into DC power and charges the battery, the inverter unit including an inverter module having plural switching elements and at least a field current control device for controlling the field current or a control device for controlling switching operations of the plural switching elements,

~~in which~~ wherein the inverter unit has a substantially hollow cylindrical shape or hollow polygonal prism shape, and ~~includes~~ a heat sink constructed with plural heat radiating fins formed of metal material in at least one part of an inner peripheral surface or an anti-bracket side end face or an outer peripheral surface, the inverter module and at least the field current control

device or the control device are mounted on the heat sink and a thermal conduction blocking portion is provided such that part of the heat sink on which the inverter module is mounted and the part of the heat sink on which the field current control device or the control device is mounted are not thermally influenced by each other, covered by a cover fixed to either one of the outer end faces of the paired brackets integrally and having a suction hole in the end face in an axis direction thereof ~~having many heat radiating fins at least part of an outer surface, and the inverter unit surrounds the shaft at an anti-load side end of the rotating electrical machine, and is~~ disposed to cause cooling air sucked through the suction hole of the cover in the axial direction by the cooling fan to cool the heat radiating fins before cooling of the rotating electrical machine.

2. (canceled).

3. (currently amended): A vehicular rotating electrical machine apparatus comprising: ~~according to claim 1, characterized in that the inverter unit includes the~~

a rotating electrical machine including a shaft rotatably supported by a pair of brackets having a suction hole at an end face and an exhaust hole at an outer periphery, a rotor disposed in the pair of brackets, fixed to the shaft, having a field winding mounted to an inside, and having cooling fans mounted to both end faces, and an armature fixed to the pair of brackets at an outer periphery of the rotor to surround the rotor and including an armature iron core on which an armature winding is wound, and

an inverter unit which converts DC power of a battery into AC power, supplies the AC power to the armature winding and causes the rotor to generate rotating power, or converts AC power generated in the armature winding into DC power and charges the battery, the inverter unit including an inverter module having plural switching elements and at least a field current control device for controlling the field current or a control device for controlling switching operations of the plural switching elements,

wherein the inverter unit has a substantially hollow cylindrical shape or hollow polygonal prism shape and a heat sink ~~having the many~~ constructed with plural heat radiating fins ~~made~~ formed of metal material in at least one ~~place~~ part of a bracket side end face and an outer peripheral surface, ~~is integrally fixed to an outside end face of one of the pair of brackets~~ the inverter module and at least the field current control device or the control device are mounted on the heat sink and a thermal conduction blocking portion is provided such that part of the heat sink on which the inverter module is mounted and the part of the heat sink on which the field current control device or the control device is mounted are not thermally influenced by each other, ~~and is~~ covered by a cover ~~provided with many~~ fixed to either one of the outer end faces of the paired brackets integrally and having plural suction holes ~~at an~~ on the outer peripheral surface, and

~~the inverter unit~~ is disposed to cause cooling air sucked ~~by the cooling fan~~ through the suction hole ~~of~~ in the outer peripheral surface of the cover by the cooling fan to cool the heat radiating fins before cooling of the rotating electrical machine.

4. (currently amended): The ~~A~~ vehicular rotating electrical machine apparatus according to claim 1~~3~~, characterized in that part of or all of the heat radiating fins are radially disposed substantially toward a center direction.

5. (currently amended): The ~~A~~ vehicular rotating electrical machine apparatus according to claim 1~~3~~, characterized in that part of or all of the heat radiating fins are disposed substantially in parallel to the shaft and to expand radially from a center direction.

6. (currently amended): The ~~A~~ vehicular rotating electrical machine apparatus according to claim 3~~1~~, characterized in that a partition wall or an air-guide wall to control an exhaust direction is provided to the cover or the bracket to which the inverter unit is fixed, so that high temperature exhaust cooling air exhausted from the exhaust hole provided in the outer periphery of the bracket is not circulated to and sucked through the suction hole of the cover.

7. (currently amended): The ~~A~~ vehicular rotating electrical machine apparatus according to claim 2~~1~~, characterized in that raw material of the cover is metal.

8. (currently amended): A vehicular rotating electrical machine apparatus comprising: ~~according to claim 1, characterized in that the inverter unit includes the~~

a rotating electrical machine including a shaft rotatably supported by a pair of brackets having a suction hole at an end face and an exhaust hole at an outer periphery, a rotor disposed in the pair of brackets, fixed to the shaft, having a field winding mounted to an inside, and having cooling fans mounted to both end faces, and an armature fixed to the pair of brackets at an outer periphery of the rotor to surround the rotor and including an armature iron core on which an armature winding is wound, and

an inverter unit which converts DC power of a battery into AC power, supplies the AC power to the armature winding and causes the rotor to generate rotating power, or converts AC power generated in the armature winding into DC power and charges the battery, the inverter unit including an inverter module having plural switching elements and at least a field current control device for controlling the field current or a control device for controlling switching operations of the plural switching elements,

wherein the inverter unit has a substantially hollow cylindrical shape or hollow polygonal prism shape and a heat sink ~~having the many~~ constructed with plural heat radiating fins ~~made of~~ formed of metal material ~~at least one place of~~ in at least one part of an inner peripheral surface, or an a bracket side end face, or ~~and~~ an outer peripheral surface, the inverter module and at least the field current control device or the control device are mounted on the heat sink and a thermal conduction blocking portion is provided such that part of the heat sink on which the inverter module is mounted and the part of the heat sink on which the field current control device or the control device is mounted are not thermally influenced by each other, ~~is integrally fixed to an inside end face of one of the pair of brackets~~ fixed to either one of the inner end faces of the paired brackets integrally and ~~the rotor and the armature are~~ partitioned by a substantially donut-

shaped partition plate ~~with~~ integrally fixed to either one of the inner side end faces of the paired brackets and having a through hole ~~at a center~~ opened at a center between the rotor and the armature; and

~~the inverter unit is~~ disposed to cause cooling air sucked through the suction hole ~~of~~ in the end face of the brackets ~~in an axial direction~~ by the cooling fan to cool the heat radiating fins before cooling of the rotating electrical machine.

9. (currently amended): The ~~A~~ vehicular rotating electrical machine apparatus according to claim ~~8~~7, characterized in that the partition plate is integrally fixed to the inverter unit.

10-14. (canceled).

15. (currently amended): The ~~A~~ vehicular rotating electrical machine apparatus according to claim ~~10~~1, characterized in that the switching elements includes SiC-MOSFETs using SiC composition material.

16. (currently amended): The ~~A~~ vehicular rotating electrical machine apparatus according to claim ~~10~~1, characterized in that the switching elements include SiC-SITs using SiC composition material.

17. (currently amended): The ~~A~~ vehicular rotating electrical machine apparatus according to ~~any one of claims~~ claim 1 ~~to 5~~, characterized in that the rotor includes

a rotor iron core including a magnetic pole part formed into a claw-pole type in which adjacent magnetic poles are different from each other and a cylindrical part having the field winding, and

a permanent magnet which is provided in a magnetic circuit of the rotor iron core and supplies, together with the field winding, a magnetic flux to the armature iron core.